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NATIONAL WIND-TUNNEL SUMMARY

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1. INTRODUCTION

This summary, prepared jointly by the National Aeronautics and Space Administration and the Department of Defense, supersedes the survey of wind tunnels contained in Characteristics of Major United States Transonic and Supersonic Wind Tunnels and Air Breathing Engine Test Facilities, dated 3 October 1956. Its purpose is to provide a ready reference on current wind-tunnel facilities for governmental, industrial and institutional organizations that employ wind tunnels and require this type of information.

The tables contain data on major wind tunnels in the United States owned by the Department of Defense, the National Aeronautics and Space Administration (NASA), industrial organizations and universities. The information was obtained from questionnaires completed and returned by the operators of the wind tunnels. Included are facilities that are now in operation or being constructed and those that are currently authorized. The wind tunnels reported in this survey are classified according to their size and speed range as follows:

Subsonic:	Below Mach 1, test section 4 feet minimum
Transonic--small:	Mach 0.8 to 1.2, test section 12 to 24 inches
large:	Mach 0.8 to 1.2, test section 24 inches minimum
Supersonic--small:	Mach 1 to 5, test section 12 to 24 inches
large:	Mach 1 to 5, test section 24 inches minimum
Hypersonic--small:	Over Mach 5, test section 12 to 24 inches
large:	Over Mach 5, test section 24 inches minimum

Because their speed ranges overlap categories, some tunnels appear in more than one table.

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2. POLICIES AND PROCEDURES

The policies and procedures applicable to the use of wind tunnels vary widely among the owners and operators. Current policies and procedures affecting government-owned facilities (Army, Navy, Air Force, NASA) are outlined in the following paragraphs.

2.1 Army.

Wind tunnels owned by the Department of the Army are available for use only by other government agencies and their contractors.

All requests for wind-tunnel testing should be submitted to the Research Branch, Research and Development Division, Chief of Ordnance (ORDTB), which allocates wind-tunnel time. Nongovernmental activities should request wind-tunnel time through their government contracting agencies. To cover costs, a transfer of funds to the Ordnance Corps by the interested government contracting agency is required.

After tests are authorized and the necessary funding transactions are completed, the contractor and the wind-tunnel installation are authorized to communicate directly with each other regarding technical details of tests and arrangements for observers.

2.2 Navy.

Wind tunnels owned by the Department of the Navy are available for use primarily by government agencies and their contractors, but, subject to pertinent regulations and time limitations, proprietary testing is permissible.

Detailed procedures for requesting wind-tunnel time may be obtained from the wind-tunnel installation concerned. Before formally requesting time, the requestor should consult with the laboratory involved.

Prior to the test, the requestor shall arrange appropriate financing with the laboratory to cover the costs.

2.3 Air Force.

To obtain testing time in wind tunnels owned by the Department of the Air Force, the following procedures should be observed:

2.3.1 Air Force Contractors: Air Force contractors should send their requests directly through the appropriate Air Force Systems Command (AFSC) system or the project officer responsible for monitoring the contract work.

2.3.2 Army and Navy Contractors: Army and Navy contractors should submit all requests through the responsible Army or Navy agency, which then should forward the approved requests to the appropriate AFSC division or center. If the requestor cannot readily identify the proper AFSC agency to receive his request, he should direct it to

Headquarters, Air Force Systems Command
Director of Operations (SCRO)
Andrews Air Force Base
Washington 25, D. C.

2.3.3 Contractors and Academic Institutions Not Operating Under Defense Contracts: All requests of these organizations should be directed to the appropriate AFSC division or center. If the proper AFSC agency to receive the request is not readily discernible, the requestor should submit it to

Headquarters, Air Force Systems Command
Director of Operations (SCRO)
Andrews Air Force Base
Washington 25, D. C.

2.4 NASA.

Testing time in wind tunnels owned by the National Aeronautics and Space Administration may be made available for two types of projects: (1) government projects--tests under projects that are conducted under contract with, supported by letter of intent from, or of vital concern to, a government agency; (2) company projects--proprietary tests conducted on a fee basis, primarily in the NASA Unitary Wind Tunnels.

It is NASA policy not to compete with commercially available wind tunnels. With the exception of the Unitary Wind Tunnels, NASA tunnels may be assigned to company projects only in unusual cases. Company projects are conducted in the NASA Unitary Wind Tunnels when they are clearly in the national interest.

The first step in obtaining testing time is to confer with the staff of the NASA activity involved to review the nature of the required tests and determine whether it is possible to obtain testing time in the desired wind tunnel. After the conference, the government agency or company requiring wind-tunnel time should formally submit its request as follows:

(1) Langley, Lewis and Ames Research Centers (government and company projects)--Address all requests to:

Director, Office of Advanced Research Programs
National Aeronautics and Space Administration
Attention: Code RTF
Washington 25, D. C.

(2) Marshall Space Flight Center (government projects only)--All requests for tests in the one available MSFC wind tunnel should be addressed to:

Director
George C. Marshall Space Flight Center
Huntsville, Alabama

(3) Jet Propulsion Laboratory (government and company projects)--Blocks of testing time have been allocated in the two JPL wind tunnels for use by the Army and the Air Force. Requests for portions of this time should be addressed to the Army or Air Force member of the NASA Aircraft and Missiles Projects Allocation and Priority Group, through the appropriate project offices in the Army or Air Force.

Requests for the use of JPL wind tunnels for other government projects and for company projects should be addressed to:

Director, Office of Space Flight Programs
National Aeronautics and Space Administration
Attention: Code DL
Washington 25, D. C.

Requests from military contractors for the use of NASA wind tunnels in connection with government projects are coordinated by the NASA Aircraft and Missiles Projects Allocation and Priority Group. All military contractors or agencies should submit requests for the use of NASA wind tunnels in accordance with the procedures established by the interested Military Department.

Table I. SUBSONIC WIND TUNN

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	8 x 10 Ft Subsonic Wind Tunnel No. 1 Aerodynamics Laboratory David Taylor Model Basin Washington 7, D. C.	BuWeps / DTMB	Technical Director Aerodynamics Laboratory David Taylor Model Basin	Research, devel., eval.	8 x 10 x 14 ft: single return, closed circuit, atmospheric test section: provision for simulating both propeller and jet power.	0 - 190 mph	Continuous
2	8 x 10 Ft Subsonic Wind Tunnel No. 2 Aerodynamics Laboratory David Taylor Model Basin Washington 7, D. C.	BuWeps / DTMB	Technical Director Aerodynamics Laboratory David Taylor Model Basin	Research, devel., eval.	Same as above.	0 - 165 mph	Continuous
3	6 Ft Wind Tunnel National Bureau of Standards Washington 25, D. C.	D/Commerce / D/Commerce	Dr. G. B. Schubauer National Bureau of Standards	Eval	6 ft octagon, 12½ ft long	0 - 175 mph	Continuous
4	4½ Ft Low Turbulence Wind Tunnel National Bureau of Standards Washington 25, D. C.	D/Commerce / D/Commerce	Dr. G. B. Schubauer National Bureau of Standards	Research	4½ ft octagon, 19 ft long	0 - 70 mph	Continuous
5	Full Scale Wind Tunnel Aero-Space Mechanics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	30 x 60 ft, semicircular sides, 56 ft long, open throat	0 - 110 mph	Continuous
6	20 Ft Free Spinning Tunnel Aero-Space Mechanics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	20 ft diam, 12-sided	0 - 60 mph	Continuous
7	300 mph, 7 x 10 Ft Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	7 x 10 ft and 15.75 x 17 ft	0 - 300 mph 0 - 70 mph	Continuous Continuous
8	12 Ft Pressure Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	12 ft diam, 4 ft wide, flat fairings on 4 sides	Mach 0 - 1.0	Continuous
9	40 x 80 Ft Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	40 x 80 ft. closed test section	0 - 230 mph	Continuous
10	7 x 10 Ft Wind Tunnels Nos. 1 and 2 NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	7 x 10 ft	0 - 280 mph	Continuous
11	6 x 9 Ft Subsonic Icing Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	NASA Director NASA Lewis Research Center	Devel	6 x 9 x 20 ft	Mach 0 - 0.45	Continuous

ELS

Table I

Running time	Stagnation press. (atmos.)	Stagnation temp. (^oR)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1	576 (with external cooling)	$0 - 1.77x10^6$	0 - 90	Yes	--	1
--	1	Same as above.	$0 - 1.54x10^6$	0 - 70	Yes	--	2
--	1	Ambient	$0 - 1.5x10^6$	0 - 75	Yes	--	3
--	1	Ambient	$0 - 0.6x10^6$	0 - 12	Yes	--	4
--	1 - 1.01	Ambient	$0 - 1x10^6$	0 - 30	Yes	--	5
--	1	Ambient	$0 - 0.60x10^6$	0 - 10	Yes	--	6
--	1	Ambient +20	$0 - 2x10^6$	0 - 200	Yes	Entrance cone used as low-speed test section for V/STOL research.	7
--	1	Ambient +20	$0 - 0.7x10^6$	0 - 12			
--	0.136 - 5.0	625	$0.5 - 9x10^6$	50 - 500	Yes	Low-turbulence flow.	8
--	1	Ambient	$0 - 2.1x10^6$	0 - 138	Yes	Accommodates operating turbojets and full-scale propellers.	9
--	1	Ambient	$0 - 2.56x10^6$	0 - 210	Yes (limited)	Both facilities are on stand-by basis; no permanent staff is assigned.	10
--	1	456 - 540 (refrigerated air flow)	$0 - 3.3x10^6$	0 - 250	Yes	Water sprays of controlled droplet size and air temperature control. Facility is on stand-by basis for use only as required by outside users	11

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
12	Subsonic Wind Tunnel United Aircraft Corporation Research Laboratories 400 Main Street East Hartford 8, Connecticut	United Aircraft / United Aircraft	E. C. Chapin, Head Subsonic Tunnels United Aircraft Corp. Research Laboratories	Research, devel., eval.	Octagonal, 8 ft across flats, 14 ft long	0 - 650 mph	Continuous
					Octagonal, 18 ft across flats, 34 ft long	0 - 200 mph	Continuous
13	4 x 6 Ft Subsonic Wind Tunnel United Aircraft Corporation Research Laboratories 400 Main Street East Hartford 8, Connecticut	United Aircraft / United Aircraft	Same as above	Research devel., eval	4 x 6 x 8 ft	0 - 110 mph	Continuous
14	7 x 10 Ft Low Speed Wind Tunnel Northrop Corporation, Norair Division 1001 Broadway Hawthorne, California	Northrop / Northrop	Chief, Aeronautical and Propulsion Sciences Group Northrop Corporation Norair Division	Research, devel.	7 x 10 x 20 ft. with 1-ft chord fillets	0 - 300 mph	Continuous
15	Low Speed Wind Tunnel McDonnell Aircraft Corporation P. O. Box 516 St. Louis 66, Missouri	McDonnell / McDonnell	Robert E. Rothert, Chief Gas Dynamics Laboratory McDonnell Aircraft Corp.	Devel., eval.	8.5 x 12 x 18 ft	0 - 240 mph	Continuous
16	Polysonic Wind Tunnel McDonnell Aircraft Corporation P. O. Box 516 St. Louis 66, Missouri	McDonnell / McDonnell	Same as above	Devel., eval.	Subsonic: 4 x 4 x 6 ft Transonic: 4 x 4 x 9 ft Supersonic: 4 x 4 x 6 ft	Mach 0.5 - 1 (Will operate up to Mach 5)	Continuous
17	Trisonic Wind Tunnel North American Aviation, Inc. El Segundo, California	N.A.A. / N.A.A.	Laboratory Director Los Angeles Div. North American International Airport Los Angeles 45, Calif.	Research, devel., eval.	7 x 7 x 23 ft	Mach 0.2 - 1 (Will operate up to Mach 3 5)	Continuous
18	Low Speed Tunnel North American Aviation, Inc. International Airport Los Angeles 45, California	N.A.A. / N.A.A.	Same as above.	Research devel., eval	7.75 x 11 x 12 ft, corner fillet radii 10.625 in.	0 - 220 mph	Continuous
19	7 x 10 Ft Subsonic Wind Tunnel Grumman Aircraft Engineering Corporation Bethpage, New York	Grumman / Grumman	W. J. Gander Grumman Aircraft Engineering Corp.	Research, devel., eval.	7 x 10 ft	140 mph	Continuous
20	Low Speed Wind Tunnel Convair Division General Dynamics Corporation P.O. Box 1950 San Diego 12, California	Convair / Convair	J. H. Struthers Convair Division General Dynamics Corp. Mail Zone 6-166	Research, devel.	8 x 12 x 15 ft, 18-in. corner fillets	40 - 300 mph	Continuous
21	Low Speed Wind Tunnel (Building 107) U.S. Naval Weapons Industrial Reserve Plant Dallas 22, Texas	BuWeps / Vought Aeronautics	R. C. McWherter Vought Aeronautics Box 5907 Dallas 22, Texas	Research, devel., eval.	7 x 10 x 16 ft	0 - 240 mph	Continuous
22	Subsonic Wind Tunnel Aerodynamics Laboratory North American Aviation, Inc. Columbus Division Columbus, Ohio	N.A.A. / N.A.A.	M. E. Stevens, Chief Aerodynamics Laboratory North American Aviation Inc. Columbus Div.	Research, devel., eval.	7 x 10 x 15 ft	40 - 300 mph	Continuous
					14 x 16 x 15 ft	11 - 18 mph	Continuous

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Table I (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1	620	$0 - 4.75\times10^6$	0 - 690	Yes	Small turbojets and rockets, 750 hp, 0 - 400 cps variable frequency power, 10 lb/sec, 400 psi air, vacuum lines for induction tests.	12
--	1	Ambient	$0 - 1.8\times10^6$	0 - 80			
--	1	620	$0 - 0.82\times10^6$	0 - 30	Yes	Auxiliary power for small helicopters, rotors and propellers. High pressure air or vacuum available for BLC.	13
--	1.0 - 1.1	580	$0 - 2\times10^6$	0 - 200	Yes	Scheduled project will keep tunnel at full 1-shift operation for next 2 years.	14
--	1	570	2.3×10^5 to 2.3×10^6	10 - 100	Yes	--	15
--	1.0 - 27.2	810	7.5×10^6 to 32.5×10^6	1500 - 6500	Yes	--	16
--	1 - 8	530	2×10^6 to 17×10^6	200 - 3100	Yes	Has subsonic, transonic and supersonic capabilities	17
--	1	570	$0 - 2\times10^6$	0 - 120	Yes	--	18
--	1	Ambient	1.3×10^6	50	No	--	19
--	1	Ambient	2.4×10^4 to 2.5×10^6	2 - 200	Yes	--	20
--	1	519	$0 - 2.2\times10^6$	0 - 150	Yes	--	21
--	1	Ambient	2.7×10^6	4 - 212	Yes	--	22
--	1	Ambient	0.84×10^6	0.3 - 17			

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
23	Galcit 10 Ft Wind Tunnel Guggenheim Aeronautical Laboratory Pasadena 4, California	Cal. Tech. Cal. Tech.	Prof. Winston Royce Guggenheim Aeronautical Laboratory	Research, devel.	10 ft diam. 10 ft long, closed section	0 - 175 mph	Continuous
24	Low Speed Wind Tunnel University of Kansas Lawrence, Kansas	U. of Kansas U. of Kansas	Aeronautical Engineering Department U. of Kansas	Instruction	5 ft diam	40 - 75 mph	Continuous
25	Low Speed Wind Tunnel University of Maryland College Park, Maryland	U. of Maryland U. of Maryland	Donald L. Gross Wind Tunnel Operations Department U. of Maryland	Research, devel., eval.	7.75 x 11 ft, rectangular	0 - 220 mph	Continuous
26	Aeroelastic and Structures Research Laboratory Flutter Tunnel (Low Speed) Massachusetts Institute of Technology Cambridge 39, Massachusetts	M.I.T. M.I.T.	A. S. Richardson Room 41-219 M.I.T.	Instruction, research	7.5 x 5 ft, rectangular, closed return	0 - 90 mph	Continuous
27	Wright Brothers Wind Tunnel Facility (Low Speed) Massachusetts Institute of Technology Cambridge 39, Massachusetts	M.I.T. M.I.T.	Prof. Joseph Bicknell Building 17 M.I.T.	Instruction, eval.	10 x 7.5 x 15 ft, elliptical variable density, 0.25 to 4 atmos. absolute	0 - 140 mph	Continuous
28	Low Turbulence Wind Tunnel University of Michigan Ann Arbor, Michigan	U. of Michigan U. of Michigan	Prof. A. M. Kuethe Aeronautical Engineering U. of Michigan	Instruction, research	5 x 7 ft	0 - 200 mph	Continuous
29	7 x 10 Ft Low Speed Wind Tunnel Aeronautical Laboratories Texas A&M College Easterwood Airport College Station, Texas	Texas A&M Texas Engineering Experiment Station	F. C. Hall, Wind Tunnel Manager Aeronautical Laboratories Box 3 F.E. College Station, Texas	Research, devel., eval.	7 x 10 x 12.3 ft	0 - 200 mph	Continuous
30	F. K. Kirsten Memorial Wind Tunnel University of Washington Seattle 5, Washington	U. of Washington U. of Washington	W. H. Rae, Jr. Supervisor, UWAL U. of Washington	Instruction, research, devel.	8 x 12 x 10 ft, rectangular, with corner fillets	250 mph	Continuous
31	7 x 10 Ft Wind Tunnel University of Wichita Department of Aeronautical Engineering Wichita, Kansas	U. of Wichita U. of Wichita	Head, Department of Aeronautical Engineering U. of Wichita	Instruction, research, devel.	7 x 10 x 12 ft, chamfered corners; auxiliary throat for 2-dimensional test, 4 x 7 ft	0 - 200 mph	Continuous
32	7 x 10 Ft Wind Tunnel University of Detroit McNichols Road Campus Detroit 21, Michigan	U. of Detroit U. of Detroit	U. of Detroit Research Institute of Science and Engineering 4001 W. McNichols Road Detroit 21, Michigan	Instruction, research, devel.	7 x 10 ft, octagonal, 12 ft long	15 - 175 mph	Continuous
33	9 Ft Wind Tunnel Daniel Guggenheim School of Aeronautics Georgia Institute of Technology Atlanta 13, Georgia	Georgia Tech. Georgia Tech.	John J. Harper Daniel Guggenheim School of Aeronautics Georgia Institute of Technology	Instruction, research, devel., eval.	9 ft diam, 11 ft long	0 - 150 mph	Continuous
34	4 x 4 Ft Wind Tunnel University of Cincinnati Department of Aeronautical Engineering Cincinnati 21, Ohio	U. of Cincinnati U. of Cincinnati	R.P. Harrington U. of Cincinnati Dept. of Aeronautical Engineering	Instruction, research	4 x 4 x 6 ft, closed throat	0 - 90 mph	Continuous

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Table I (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (^{o}R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1	460	$0 - 1.3 \times 10^6$	0 - 60	Yes	--	23
--	1	Ambient	0.50×10^6	15	Yes	To be replaced by new, low-turbulence tunnel with throat 3 x 3 ft.	24
--	0 - 8.5	530	$0 - 2.06 \times 10^6$	0 - 123.8	Yes	--	25
--	1.2 - 2.8	510 - 560	$0 - 0.8 \times 10^6$	20		--	26
--	0.5 - 1	580	$1.2 - 3 \times 10^6$	20 - 60	Yes	--	27
--	1	600	$0 - 1 \times 10^6$	0 - 100	Yes	Gust simulation; very low turbulence.	28
--	1	500 max.	$0 - 19 \times 10^5$	0 - 100	Yes	--	29
--	1.07	Not applicable	$0 - 1.8 \times 10^6$	1 - 160	Yes	--	30
--	1	585	$0 - 1.7 \times 10^6$	0 - 102.5	Yes	--	31
--	--	--	--	--	Yes	--	32
--	1	590	$0 - 1.6 \times 10^6$	0 - 57	Yes	--	33
--	0 - 1.5	Ambient	0.75×10^6	0 - 22	Yes	--	34

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
35	Atmospheric Tunnel Guggenheim Aeronautical Laboratory Stanford University Stanford, California	Stanford U. / Stanford U.	Prof. E. G. Reid Guggenheim Aeronautical Laboratory Stanford University	Instruction, research	7.5 ft diam, 4.5 ft long, free jet	0 - 90 mph	Continuous
36	4 x 8 Ft Three Dimensional Tunnel The James Forrestal Research Center Princeton University Department of Aeronautical Engineering Princeton, New Jersey	Princeton U. / Princeton U.	A. A. Nikolsky The James Forrestal Research Center Princeton University	Research	4 x 8 ft	0 - 50 mph	Continuous
37	4 x 5 Ft Three Dimensional Tunnel The James Forrestal Research Center Princeton University Department of Aeronautical Engineering Princeton, New Jersey	Princeton U. / Princeton U.	Same as above	Instruction, research	4 x 5 ft	0 - 150 mph	Continuous

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Table I (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (^{o}R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1	Ambient	--	0 - 20.5	Yes	--	35
--	1	Ambient	--	--	Yes	--	36
--	1	Ambient	--	--	Yes	--	37

4. C.

Table II. SMALL TRANSONIC WIND T

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	Transonic Wind Tunnel Aerodynamic Test Laboratory U. S. Naval Missile Center Point Mugu, California	BuWeps / U. of Southern California Engineering Center	R. H. Peterson Laboratory Officer, Code 5400 USNMC	Research, devel., eval.	16.43 x 16 in.	Mach 0.5 - 1.6	Continuous
2	Supersonic Tunnel No. 1 Naval Ordnance Laboratory, White Oak Silver Spring, Maryland	BuWeps / NOL, White Oak	Dr. R. Kenneth Lobb Aerodynamics Department NOL, White Oak	Research, eval., devel.	16 x 16 in., fixed block nozzle, adjustable diffuser	3 nozzles: Mach 0.2 - 0.85 0.2 - 1.3 1.2 - 5	Intermittent
3	Supersonic Tunnel No. 2 Naval Ordnance Laboratory, White Oak Silver Spring, Maryland	BuWeps / NOL, White Oak	Dr. R. Kenneth Lobb Aerodynamics Department NOL, White Oak	Research, eval., devel.	16 x 16 in., fixed block nozzle, adjustable diffuser	Same as above	Continuous
4	Transonic Model Tunnel Propulsion Wind Tunnel Arnold Engineering Development Center Arnold Air Force Station, Tennessee	USAF / ARO, Inc.	G. Chester Furlong AEDC (AEOT) Arnold AF Station	Devel., eval.	12 x 12 x 37.5 in.	Mach 0.55 - 1.5	Continuous
5	12 Inch Transonic Tunnel (SCARF III) Sandia Corporation Sandia Base Albuquerque, New Mexico	AEC / Sandia	R. C. Maydew, Supervisor Exp. Aerodynamics Div. 7132 Sandia Corp.	Research, devel.	12 x 12 x 36 in., 6% perforated walls	Mach 0.4 - 3	Intermittent
6	2 Ft Transonic Aeroelasticity Tunnel Dynamic Loads Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	24 x 24 in.	0 - Mach 1.2	Continuous
7	22 Inch Transonic Tunnel (Induction) Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	Octagonal, 20 in. between flaps	Mach 0.5 - 1.4	Intermittent
8	1 x 3.5 Ft Transonic Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	12 x 35 in., solid side walls, floor and ceiling perforated	Mach 0.5 - 1.1	Continuous
9	2 x 2 Ft Transonic Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	2 x 2 x 5 ft, all 4 walls porous	0 - Mach 1.4	Continuous
10	14 x 14 Inch Trisonic Wind Tunnel NASA Marshall Space Flight Center Huntsville, Alabama	NASA / NASA	T. G. Reed NASA Marshall Space Flight Center	Research, devel.	14 x 14 in.	Mach 0.4 - 5	Intermittent
11	17 Inch Blowdown Tunnel United Aircraft Corporation Research Laboratories 400 Main Street East Hartford 8, Connecticut	United Aircraft / United Aircraft	George D. Dickie Head, Supersonic Tunnels United Aircraft Corp. Research Laboratories	Research, devel., admin.	17 x 17 in. square, transonic	Mach 0.5 - 1.5 porous walls	Intermittent

5-A

TUNNELS

Table II

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1 - 4	590	2×10^6 to 9×10^6	72 - 1728	Yes	--	1
Blowdown 0 - 60 sec	1	530	0.9 - 4.6×10^6	72 - 880	Yes	--	2
--	0.8 - 3.2 (future 0.8 - 15)	560 (future 630)	2.7 - 4.4×10^6	245 - 1000	Yes	--	3
--	1.37	120 above ambient	3.5×10^6 to 4.6×10^6	425 - 1240	Yes	--	4
1.5 - 30 sec normal, 2 min max.	1 - 5	580	2 - 12×10^6	187 - 2113	Yes	Top and bottom walls of test section converge or diverge. Adjustable ejector flaps provide plenum chamber suction.	5
--	0.1 - 1.0	585	To 9×10^6	To 450	Yes (limited)	Used as a vacuum vessel for another tunnel; is available only on limited basis (Freon or air).	6
30 sec	1 - 2	Ambient	4.6×10^6 to 9.5×10^6	385 - 1730	No	On stand-by basis.	7
--	1	Ambient	3.1 - 4.75×10^6	800 - 1800	No	On stand-by basis; no permanent staff attached.	8
--	0.16 - 2.33	580	1 - 8.7×10^6	60 - 2175	Yes	Being converted to stand-by basis.	9
15 - 45 sec	1.2 - 7	660	11 - 18×10^6	70 - 2880	Yes	Special test section allows cold rocket base flow testing.	10
25 - 90 sec	1.7 - 5.0	520 - 540 Not controllable	4.8 - 21.6×10^6	450 - 4500	Yes	--	11

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
12	Trisonic 1 Ft Tunnel Douglas Aerophysics Laboratory 2332 East El Segundo Boulevard El Segundo, California	Douglas / Douglas	R. W. Bratt Douglas Aircraft Co., Inc. 827 Lapham Street El Segundo, Calif.	Research, devel.	1 x 1 x 3 ft 1 x 1 x 1 ft	Mach 0.2 - 1.8 Mach 3.5	Intermittent
13	Wright Brothers Wind Tunnel Facility Massachusetts Institute of Technology Cambridge 39, Massachusetts	M.I.T. / M.I.T.	Prof. Joseph Bicknell Building 17 M.I.T.	Instruction, research	22 in., octagonal, sliding block 20 x 14 in.	Mach 0.7 - 1.3	Intermittent (blowdown)
14	Supersonic Wind Tunnel Naval Supersonic Laboratory Massachusetts Institute of Technology Cambridge 39, Massachusetts	Navy / M.I.T.	Don H. Ross or Seth Briggs Naval Supersonic Laboratory 516 Memorial Drive M.I.T.	Research, devel.	18 x 24 in. 18 x 18 in. 18 x 24 in. 18 x 18 in. 18 x 24 in.	Mach 0.4 - 0.8 Mach 0.8 - 1.2 Mach 1.5 - 2.5 Mach 3 - 3.5 Mach 4 - 7.6	Continuous
15	Transonic Wind Tunnel Rosemount Aeronautical Laboratories University of Minnesota Rosemount, Minnesota	Air Force / Rosemount	Dr. Rudolf Hermann Rosemount Aeronautical Laboratories	Research, devel.	16 x 16 x 32 in. or 12 x 16 x 43 in.	0 - Mach 1.2	Continuous
16	12 x 12 Inch Transonic Wind Tunnel Aerodynamic Laboratory The Ohio State University Columbus 10, Ohio	Ohio State U. / Ohio State U.	Dr. J. D. Lee Aerodynamic Laboratory Don Scott Field Columbus 10, Ohio	Research, devel.	12 x 12 x 42 in.; porous walls can be varied from 12 to 48% open area.	0 - Mach 1.5	Intermittent

6-A

Table II (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
40 sec	1.2 - 7.5	560	$0 - 14.8 \times 10^6$	100 - 3000	Yes		12
10 - 20 sec	1.5 - 2.5	580	0.3×10^6 to 0.5×10^6	1000 - 1750	Yes	--	13
--	2 - 6	585 (Mach 0.4-4) 1200 (Mach 7.6)	$4 - 6.5 \times 10^6$	2 - 6	Yes	Stagnation temperature of 2465°R is now available for Mach 3.5 and can be available for Mach 0.4 to 4 by simple modification.	14
--	1	Ambient	$0 - 4.9 \times 10^6$	0 - 900	--	--	15
20 - 60 sec	0.3	Ambient	$5 - 28 \times 10^6$	680 - 4300	Yes	Small engines can be operated.	16

6 - C

Table III. LARGE TRANSONIC WIND

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	7 x 10 Ft Transonic Wind Tunnel Aerodynamics Laboratory David Taylor Model Basin Washington 7, D. C.	BuWeps / DTMB	Technical Director Aero Laboratory David Taylor Model Basin	Research, devel., eval.	7 x 10 x 18 ft	Mach 0.3 - 1.17	Continuous
2	Transonic Circuit Tunnel Propulsion Wind Tunnel Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Mr. G. Chester Furlong AEDC (AEOT)	Devel., eval.	16 x 16 x 40 ft	Mach 0.5 - 1.6	Continuous
3	26-In. Transonic Blowdown Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	Octagonal 26 in. between flats	Mach 0.6 - 1.4	Intermittent (blowdown)
4	Transonic Dynamics Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	16 x 16 ft with 2 ft of corners cropped	Mach 0.1 - 1.2	Continuous
5	16-Ft Transonic Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	Octagonal, 15.5 ft across flats, 22 ft long	Mach 0.2 - 1.3	Continuous
6	8-Ft Transonic Pressure Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	85.5 x 85.5 in, 60 in. long	0 - Mach 1.2	Continuous
7	8-Ft Transonic Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	Dodecagonal, 87 in. across flats, 60 in. long	0 - Mach 1.285	Continuous
8	7 x 10 Ft Transonic Wind Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	6.6 x 9.6 ft slotted	0 - Mach 1.2	Continuous
9	14-Ft Transonic Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	13.5 x 13.5 x 34 ft	Mach 0.6 - 1.2	Continuous
10	6 x 6 Ft Supersonic Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	6 x 6 ft sliding block nozzle	Mach 0.65 - 2.2	Continuous
11	11 x 11 Ft Transonic Tunnel (Unitary Plan Wind Tunnel) NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research, devel., eval.	11 x 11 x 22 ft: all 4 walls slotted	Mach 0.7 - 1.4	Continuous

7-A

TUNNELS

Table III

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	0.38 - 1.6	610	$1 - 6 \times 10^6$	50 - 950	Yes	--	1
--	0.019 - 1.9	620	5.5×10^4 to 8.3×10^6	6 - 1650	Yes	Can accommodate air-breathing engines and rockets.	2
60 sec	1.5 - 5.1	Ambient	$6 - 25.5 \times 10^6$	625 - 4650	Yes	--	3
--	0.01 - 1.0	610	9×10^4 to 7×10^6 (Freon) 3.5×10^4 to 2×10^6 (air)	6 - 400 (Freon) 6 - 300 (air)	No	--	4
--	1	635	$1.2 - 4.15 \times 10^6$	57 - 905	Yes	--	5
--	0.25 - 2.0	585	$1.1 - 5.9 \times 10^6$	380 - 1260	Yes	--	6
--	1	660	$3.6 - 4.4 \times 10^6$	0 - 880	No	On stand-by basis.	7
--	1	630	$0 - 4 \times 10^6$	0 - 880	Yes (limited)	--	8
--	1	640	$2.8 - 4.2 \times 10^6$	425 - 885	No	On stand-by basis.	9
--	0.3 - 1.0	580	$1 - 5 \times 10^6$	200 - 1000	Yes	--	10
--	0.25 - 2.25	580	$1 - 10 \times 10^6$	200 - 2000	Yes	--	11

7-C

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
12	8 x 6 Ft Supersonic Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	NASA Director NASA Lewis Research Center	Research, devel.	8 x 6 x 39 ft; upstream half for supersonic: all 4 sides downstream half perforated for transonic	Mach 0.8 - 2.1	Continuous
13	10-Ft Transonic Wind Tunnel Wright-Patterson Air Force Base, Ohio	Air Force / ASD	F. J. A. Huber WWFEAK Wright-Patterson AFB	Devel., research	10 ft diam, slotted walls	Mach 0.4 - 1.2	Continuous
14	Transonic Wind Tunnel Edmund T. Allen Memorial Aeronautical Laboratory Boeing Airplane Company Seattle, Washington	Boeing / Boeing	John H. Russell Chief Wind Tunnel Engineer Dept. 2-5000 Box 50-82 Boeing Airplane Co.	Research, devel.	8 x 12 ft, corner fillets	0 - Mach 1.3	Continuous
15	Transonic Wind Tunnel Republic Aviation Corporation Farmingdale, New York	Republic / Republic	A. D. Cravero Chief Wind Tunnel Engineer (Acting) Republic Aviation Corp.	Devel., eval.	26 in., octagonal, area 576 sq in.	100 mph to Mach 1.4	Intermittent
16	Polysonic Wind Tunnel McDonnell Aircraft Corporation P. O. Box 516 St. Louis 66, Missouri	McDonnell / McDonnell	Robert R. Rothert, Chief Gas Dynamics Laboratory McDonnell Aircraft Corp.	Devel., eval.	Transonic: 4 x 4 x 9 ft Subsonic and supersonic: 4 x 4 x 6 ft	Mach 0.5 - 5	Intermittent
17	Trisonic Wind Tunnel North American Aviation, Inc. El Segundo, California	N.A.A. / N.A.A.	Laboratory Director Los Angeles Division North American Aviation, Inc. International Airport Los Angeles 45, Calif.	Research, devel.,	7 x 7 x 23 ft	Mach 0.2 - 3.5	Intermittent
18	8-Ft Transonic Wind Tunnel Cornell Aeronautical Laboratory, Inc. 4455 Genesee St. Buffalo 21, New York	Cornell and Air Force / Cornell	John P. Andes, Head Hypersonic Tunnel Dept. Cornell Aeronautical Laboratory, Inc.	Research, devel., eval.	8 x 8 ft	Mach 1.3	Continuous
19	High Speed Wind Tunnel Convair Division General Dynamics Corporation P. O. Box 1950 San Diego 12, California	Convair / Convair	W. T. MacCarthy, Chief Aero Laboratory Convair Division General Dynamics Corp. Mail Zone 61-10	Research, devel.	Transonic: 4 x 4 x 6 ft Supersonic: 4 x 4 x 5 ft	Mach 1.4 - 5 Mach 0.5 - 2	Intermittent
20	High Speed Wind Tunnel Vought Aeronautics A Division of Chance Vought Aircraft, Inc. Box 5907 Dallas, Texas	Vought / Vought	R. C. McWhorter, Chief Wind Tunnel Laboratories Vought Aeronautics	Research, devel., eval.	4 x 4 x 6 ft	Mach 0.2 - 1.8 Mach 1.2 - 5	Intermittent

Table III (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1.06 - 1.73	720	$4.2 - 4.8x10^6$	650 - 1240	Yes	Can accommodate air-breathing engines and rockets.	12
--	0.25 - 2.0	620	$7.5x10^6$	1000	No	On stand-by basis.	13
--	1	600	$0 - 4x10^6$	0 - 940	No	--	14
15 - 30 sec	1.0 - 1.8	Ambient	$5 - 30x10^6$	0 - 4600	Yes	--	15
40 sec to 2 min	1.0 - 27.2	810	$7.5 - 32.5x10^6$	1500 - 6500	Yes	--	16
10 - 50 sec	1 - 8	530	$2 - 17x10^6$	200 - 3100	Yes	--	17
--	0.1 - 2.5	615	$1 - 7x10^6$	50 - 800	Yes	--	18
20 - 150 sec	1 - 22.5	680	$4.5 - 25x10^6$	1000 - 2500	Yes	--	19
--	1.7 - 23.8	640	$1.6 - 38x10^6$	900 - 5000	--	--	20

8 C.

Table IV. SMALL SUPERSONIC WIND

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	Aberdeen Wind Tunnel No. 1 Ballistic Research Laboratories Aberdeen Proving Ground Aberdeen, Maryland	Army Ordnance / BRL	Robert H. Krieger Supersonic Wind Tunnel Branch, Exterior Ballistics Lab., BRL	Research, devel.	15 x 13 in., with 30 in. test rhombus	Mach 1.4 - 5 in ½-Mach increments	Continuous
2	Aberdeen Wind Tunnel No. 3 Ballistic Research Laboratories Aberdeen Proving Ground Aberdeen, Mayland	Army Ordnance / BRL	Same as above	Research, devel.	20 x 15 in., with 36-in. test rhombus	Mach 1.28 - 4.89 in ½-Mach increments	Continuous
3	Supersonic Wind Tunnels Aerodynamics Laboratory David Taylor Model Basin Washington 7, D. C.	BuWeps / DTMB	Technical Director Aerodynamics Laboratory David Taylor Model Basin	Research, devel., eval.	18 x 18 in.	Mach 0.2 - 2.92	Intermittent
4	Supersonic Wind Tunnel Aerodynamic Test Laboratory U. S. Naval Missile Center Point Mugu, California	BuWeps / U. of So. Cal. Engineering Center	R. H. Peterson Lab. Office, Code 5400 U. S. Naval Missile Center	Research, devel., eval.	20.8 x 17 in. 20.8 x 21.8 in.	Mach 1.6 - 6	Continuous
5	Supersonic Tunnel No. 1 Naval Ordnance Laboratory White Oak, Silver Spring, Maryland	BuWeps / NOL, White Oak	Dr. R. Kenneth Lobb Aerodynamics Dept. NOL, White Oak	Research, devel., eval.	16 x 16 in., open jet, fixed block nozzles, adjustable diffuser	Mach 0.2 - 5	Intermittent
6	Supersonic Wind Tunnel No. 2 Naval Ordnance Laboratory White Oak, Silver Spring, Maryland	BuWeps / NOL, White Oak	Same as above	Research, devel., eval.	Same as above	Mach 0.2 - 5	Continuous
7	Tunnel E-1 Von Karman Gas Dynamics Facility Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Mr. G. Chester Furlong AEDC (AEOT)	Research, devel.	12 x 12 in., variable geometry, flexible nozzle	Mach 1.5 - 5	Intermittent
8	12-Inch Transonic Tunnel (Scarf III) Sandia Corporation Sandia Base Albuquerque, New Mexico	AEC / Sandia	R. C. Maydew Supervisor Experimental Aerodynamics Div. 7132, Sandia Corp.	Research, devel.	12 x 12 x 36 in., 6% perforated walls	Mach 0.4 - 3	Intermittent
9	20-Inch Variable Mach Number Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	20 x 20 in.	Mach 3 - 5	Intermittent
10	20-Inch Variable Supersonic Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	20 x 20 in. 2-dimensional variable throat	Mach 2 - 5	Intermittent (blowdown)

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TUNNELS

Table IV

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	0.5 - 6.6	590	1 - 12x10^6	35 - 1800	Yes	Test section has flexible nozzle, variable diffuser, continuous flow, variable density and Mach number.	1
--	1 - 4	590	1.5 - 11x10^6	75 - 1600	Yes	Test section has flexible nozzle, variable diffuser, variable density and Mach number. Air supplied by 5 centrifugal-type compressors, 13,000 hp.	2
25 sec	1	Ambient	2 - 4.8x10^6	0 - 18	Yes	--	3
--	1 - 11	830 - 1150	2 - 9x10^6	72 - 1728	Yes	--	4
0 - 60 sec	1	530	0.9 - 4.6x10^6	72 - 880	Yes	--	5
--	0.8 - 3.2 (future 0.8 - 15)	560 (future 630)	2.7 - 4.4x10^6	245 - 1000	Yes	--	6
5 min	0.055 - 4.0	510 - 560	0.25 to 18.7x10^6	37 - 3600	Yes	--	7
15 - 30 sec normal, 2 min max.	1 - 5	580	2 - 12x10^6	187 - 2113	Yes	Top and bottom walls of test section converge or diverge. Adjustable ejector flaps provide plenum chamber suction.	8
30 min (blowdown)	3.3 - 33	1060	7 - 74x10^6	900 - 9000	Yes	--	9
20 min	1.5 - 8.1	720	5.1 - 33x10^6	900 - 6200	Yes	--	10

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
11	2 x 2 Ft Low Density Hypersonic Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	24 x 24 in., 54 in. long	Mach 3 - 7	Continuous
12	1 x 3 Ft Supersonic Wind Tunnel No. 1 NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	12 in. wide, 18 - 34 in. high	Mach 1.4 - 6.15	Continuous
13	1 x 1 Ft Variable Reynolds Number Supersonic Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	NASA Director NASA Lewis Research Center	Research	1 x 1 x 6 ft	Mach 5.0	Continuous
14	1 x 1 Ft Variable Mach Number Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	Same as above	Research	1 x 1 x 4 ft	Mach 1.3 - 5 (8 increments)	Continuous
15	18 x 18 Inch Mach 1.91 Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	Same as above	Research	1.5 x 1.5 x 3 ft	Mach 1.91	Continuous
16	18 x 18 Inch Mach 3.05 Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	Same as above	Research	1.5 x 1.5 x 4 ft	Mach 3.05	Continuous
17	2 x 2 Ft Supersonic Mach 3.96 Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	Same as above	Research	2 x 2 x 4 ft	Mach 3.96	Continuous
18	14 x 14 Inch Trisonic Wind Tunnel NASA Marshall Space Flight Center Huntsville, Alabama	NASA / NASA	T. G. Reed NASA Marshall Space Flight Center	Research, devel.	14 x 14 in.	Mach 0.4 - 5	Intermittent
19	20-Inch Supersonic Wind Tunnel Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, California	NASA / JPL	Director Jet Propulsion Lab.	Research, devel.	18 x 20 in.	Mach 1.25 - 5.6 (flexible nozzle)	Continuous
20	2-Ft Supersonic Wind Tunnel Gas Dynamics Facility Aeronautical Systems Division Wright-Patterson Air Force Base, Ohio	Air Force / ASD	P. J. Corcoran ASD-WWFP Wright-Patterson AFB	Research, devel.	2 x 2 ft, fixed nozzles	Mach 1.51 - 5	Continuous
21	17-Inch Blowdown Tunnels United Aircraft Corporation Research Laboratories 400 Main Street East Hartford 8, Connecticut	United Aircraft / United Aircraft	George D. Dickie, Head Supersonic Tunnels United Aircraft Corp. Research Laboratories	Research, devel.	17 x 17 in. square, supersonic	Mach 1.5 - 5, variable contour plates	Intermittent
22	Supersonic Wind Tunnel Republic Aviation Corporation Farmingdale, New York	Republic / Republic	Mr. A. D. Cravero Chief Wind Tunnel Engineer (Acting) Republic Aviation Corp.	Devel., eval.	15 x 15 in. square	Mach 1.5 - 4	Intermittent

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Table IV (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	0.25 - 3.7	1200	0.14 - 1.5x10^6	15 - 340	Yes	--	11
--	1.3 - 4.0	690	0.5 - 12x10^6	122 - 3400	Yes	--	12
--	3.9 - 9.5	760	2 - 9x10^6	215 - 670	No	On stand-by basis.	13
--	0.7 - 9.5	760	0.5 - 15.6x10^6	156 - 5150	No	On stand-by basis.	14
--	1.0	660	3.3x10^6	795	No	On stand-by basis.	15
--	1.0	660	1.7x10^6	345	No	On stand-by basis. Gaseous nitrogen available to 700 psi for cold jet work.	16
--	1.0	660	1x10^6	160	No	Same as above; also, H_2O_2 fuel system 0.5 lb/sec at 600 psi maximum.	17
15 - 45 sec	1.2 - 7.0	660	11 - 18x10^6	70 - 2880	Yes	Special test section allows cold rocket base flow testing.	18
--	0.15 - 4.5	620	0.1 - 7.15x10^6	6 - 1584	Yes	High-pressure air for cold jet testing; may be run open jet for burning rocket models.	19
--	0.02 - 2.5	630	70,000 to 7.5x10^6	15 - 1300	Yes	--	20
15 - 90	2.8 - 21	--	8.4 - 27.6x10^6	1000 - 7500	Yes	--	21
40 sec to 3 min	2 - 40	Ambient	10 - 65x10^6	1100 - 5400	Yes	--	22

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
23	Supersonic Facility Grumman Aircraft Engineering Corporation Bethpage, New York	Grumman / Grumman	W. J. Gander Grumman Aircraft Engineering Corp Bethpage, New York	Research, devel.,	12 x 12 in., with a step expansion to 15.4 x 12 in.	Mach 1.43, 1.96, 2.97 and 4.0	Intermittent
24	Trisonic 1-Ft Tunnel Douglas Aerophysics Laboratory 2332 E. El Segundo Boulevard El Segundo, California	Douglas / Douglas	R. W. Bratt, Chief Aerophysics Laboratory Douglas Aircraft Co., Inc. 827 Lapham Street El Segundo, California	Research, devel.	1 x 1 x 3 ft 1 x 1 x 1 ft	Mach 0.2 - 1.8 Mach 3.5	Intermittent
25	Supersonic Tunnel Naval Supersonic Laboratory Massachusetts Institute of Technology Cambridge 39, Massachusetts	Navy / M.I.T.	Don H. Ross or Seth Briggs Naval Supersonic Lab. 560 Memorial Drive M.I.T.	Research, devel.	18 x 24 in. 18 x 18 in. 18 x 24 in. 18 x 18 in. 18 x 24 in.	Mach 0.4 - 0.8 Mach 0.8 - 1.2 Mach 1.5 - 2.5 Mach 3 - 3.5 Mach 4 - 7.6	Continuous
26	Tunnel No. 2 Rosemount Aeronautical Laboratories University of Minnesota Rosemount, Minnesota	Air Force / Rosemount	Karl Stefan Rosemount Aeronautical Laboratories	Research, devel.	12 x 12 in	Mach 1.5 - 10	Intermittent
27	Tunnel No. 4 Rosemount Aeronautical Laboratories University of Minnesota Rosemount, Minnesota	Air Force / Rosemount	Dr. Rudolf Hermann Rosemount Aeronautical Laboratories	Research, devel.	12 x 12 in.	Mach 5.5 - 10	Intermittent
28	Plasma Jet Hypersonic Hyperthermal Wind Tunnel Aero Space Sciences Laboratory School of Aeronautics and Engineering Sciences Purdue University Lafayette, Indiana	Purdue / Purdue	Prof. George M. Palmer School of Aeronautics and Engineering Sciences Purdue University	Instruction, research, devel.	1 ft diam or less	0 - Mach 10 but hyperthermal in nature	Continuous
29	12 x 12 Inch Supersonic Wind Tunnel Aerodynamics Laboratory The Ohio State University Columbus 10, Ohio	Ohio State U. / Ohio State U.	Dr. J. D. Lee Aerodynamic Laboratory Don Scott Field Columbus 10, Ohio	Research, devel.	12 x 12 in. free jet	Mach 2.5 - 4.25	Intermittent

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Table IV (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (^{o}R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
30 - 90 sec	2.5 - 34	487	$14.5 - 80 \times 10^6$	2300 - 7770	Yes	--	23
40 sec	1.2 - 7.5	560	$0 - 14.8 \times 10^6$	100 - 3000	Yes		24
--	Min.: 4.9 (except that for Mach 7.6 it's 293); Max.: Varies from 215 to 980, depending on Mach no.	To 1300	0.02×10^6 to 0.06×10^6	2 - 6	Yes	--	25
30 sec	To 40.8	To 1400	$1.5 - 20 \times 10^6$ (Mach 2) $0.28 - 3.6 \times 10^6$ (Mach 7) $0.1 - 0.6 \times 10^6$ (Mach 10)	425 - 18,500 (Mach 1.5) 60 - 400 (Mach 7)	Yes	--	26
30 - 120 sec	3.3 - 11	3000	$0.1 - 1.6 \times 10^6$ (Mach 7) $0.4 - 3 \times 10^6$ (Mach 10)	60 - 200 (Mach 7)	Yes	--	27
--	Vacuum to 30	10,000 - 12,000	Not yet defined	10 - 1000	Yes	--	28
20 - 60 sec	4 - 100	Ambient	$12 - 70 \times 10^6$	2160 - 36,000	Yes	--	29

Table V. LARGE SUPERSONIC WIND TU

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	Supersonic Wind Tunnel Ordnance Aerophysics Laboratory P. O. Box 947 Daingerfield, Texas	BuWeps / Convair	J. E. McMichael Ordnance Aerophysics Laboratory	Research, devel., eval.	3 cells: 1--12 ft diam, nozzles to 48 in. 2--15 ft diam, nozzles to 48 in. 3--2 ft diam, nozzles to 12 in. All low-pressure exhaust	Mach 1.5 - 5	Continuous
2	Supersonic Circuit, Propulsion Wind Tunnel Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Mr. G. Chester Furlong AEDC (AEOT)	Devel., eval.	16 x 16 x 40 ft	Mach 1.5 - 4	Continuous
3	Tunnel A Von Karman Gas Dynamics Facility Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Mr. G. Chester Furlong AEDC (AEOT)	Devel., eval.	40 x 40 in., variable geometry flexible nozzle	Mach 1.5 - 6	Continuous
4	4 x 4 Ft Supersonic Pressure Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	4.5 ft square	Mach 1.25 - 2.2	Continuous
5	Unitary Plan Wind Tunnel NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	4 x 4 x 7 ft 4 x 4 x 7 ft	Mach 1.5 - 2.8 Mach 2.3 - 4.65	Continuous Continuous
6	9 x 6 Ft Thermal Structures Tunnel Structures Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	8.75 x 6 x 10 ft	Mach 3	Intermittent (blowdown)
7	6 x 6 Ft Supersonic Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	6 x 6 ft, sliding block nozzle; perforated floor and ceiling	Mach 0.65 - 2.2	Continuous
8	8 x 7 Ft Supersonic Tunnel (Unitary Plan Wind Tunnel) NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Devel., eval.	8 x 7 ft	Mach 2.4 - 3.5	Continuous
9	9 x 7 Ft Supersonic Wind Tunnel (Unitary Plan Wind Tunnel) NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Devel., eval.	9 x 7 ft	Mach 1.5 - 2.5	Continuous
10	10 x 10 Ft Unitary Supersonic Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	NASA Director NASA Lewis Research Center	Research, devel.	10 x 10 x 40 ft Propulsion circuit: Aerodynamic circuit:	Mach 2 - 3.5	Continuous

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INNELS

Table V

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	Up to 32 vacuum equipments available for low-pressure operation	1--1460 (1600 lb/sec + 215 psia) 2--2250 (200 lb/sec + 215 psia) 3--1460 (200 lb/sec + 315 psia)	0.4×10^6 to 32×10^6 (normal operation) with 215 psia and 3000°F inlet	Up to 1520	Yes	--	1
--	0.019 - 0.95	1110	2.3×10^4 to 3.2×10^6	3 - 730	Yes	Can accommodate air-breathing and rocket engines.	2
--	0.07 - 13.6	760	$0.5 - 8.5\times10^6$	45 - 1780	Yes	--	3
--	0.13 - 2.5	590	$0.5 - 9\times10^6$	100 - 2000	Yes	--	4
--	0.14 - 4	760	$0.3 - 15\times10^6$	100 - 3500	Yes	--	5
--	0.20 - 10	760	$0.3 - 11\times10^6$	70 - 1750			
30 - 80 sec	3.4 - 16.6	1120	$2.7 - 18.5\times10^6$	1230 - 4950	Yes	--	6
--	0.3 - 1.0	580	$1 - 5\times10^6$	200 - 1000	Yes	--	7
--	0.15 - 2.0	580	$0.5 - 5\times10^6$	200 - 1000	Yes	--	8
--	0.15 - 2.0	580	$1 \times 7\times10^6$	200 - 1550	Yes	--	9
--	0.62 - 2.36 0.1 - 2.36	1160 1160	$2.1 - 2.8\times10^6$ $0.2 - 2.8\times10^6$	500 - 600 20 - 720	Yes	Can accommodate operating air-breathing or rocket engines.	10

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
11	8 x 6 Ft Supersonic Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	NASA Director NASA Lewis Research Center	Research, devel.	8 x 6 x 39 ft; upstream half for supersonic; all 4 sides downstream half perforated for transonic	Mach 0.8 - 2.1	Continuous
12	Supersonic Wind Tunnel Edmund T. Allen Memorial Aeronautical Laboratory Boeing Airplane Company Seattle, Washington	Boeing / Boeing	John H. Russell, Chief Wind Tunnel Engineer Department 2-5000 Box 50-82 Boeing Airplane Co.	Research, devel.	4 x 4 x 5 ft	Mach 1.2 - 4	Intermittent
13	Polysonic Wind Tunnel McDonnell Aircraft Corporation P. O. Box 516 St. Louis 66, Missouri	McDonnell / McDonnell	Robert R. Rothert, Chief Gas Dynamics Laboratory McDonnell Aircraft Corp.	Devel., eval.	Supersonic and subsonic: 4 x 4 x 6 ft Transonic: 4 x 4 x 9 ft	Mach 0.5 - 5	Intermittent
14	Trisonic Wind Tunnel North American Aviation, Inc. El Segundo, California	N.A.A. / N.A.A.	Laboratory Director Los Angeles Division North American Aviation, Inc. International Airport Los Angeles 45, Calif.	Research, devel., eval.	7 x 7 x 23 ft	Mach 0.2 - 3.5	Intermittent
15	High Speed Wind Tunnel Convair Division of General Dynamics Corporation P. O. Box 1950 San Diego 12, California	Convair / Convair	W. T. MacCarthy, Chief Aero Laboratories Convair, Div. of General Dynamics Corp. Mail Zone 61-10	Research, devel.	Supersonic: 4 x 4 x 5 ft Transonic: 4 x 4 x 9 ft	Mach 0.5 - 2 Mach 1.4 - 5	Intermittent
16	High Speed Wind Tunnel Vought Aeronautics A Division of Chance Vought Aircraft, Inc. Box 5907 Dallas 22, Texas	Vought / Vought	Mr. R. C. McWherter, Chief Wind Tunnel Laboratories Vought Aeronautics	Research, devel., eval.	4 x 4 x 6 ft	Mach 0.2 - 1.8 Mach 1.2 - 5	Intermittent
17	Supersonic 4-Ft Tunnel Douglas Aircraft Company 3000 Ocean Park Boulevard Santa Monica, California	Douglas / Douglas	R. W. Bratt Douglas Aircraft Co. 827 Lapham Street El Segundo, California	Research, devel.	4 x 4 x 5 ft	Mach 1.4 - 5	Intermittent
18	Lockheed 4 x 4 Ft Supersonic Wind Tunnel Lockheed Aircraft Corporation California Division P. O. Box 551 Burbank, California	Lockheed / Lockheed	Mr. B. D. O'Laughlin Lockheed Aircraft Corp.	Research, devel.	4 x 4 x 10 ft	Mach 1.2 - 5	Intermittent

Table V (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (^oR)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1.06 - 1.73	720	$4.2 - 4.8x10^6$	650 - 1240	Yes	Can accommodate operating air-breathing or rocket engines.	11
5 - 35 sec	1.36 - 8.5	525	$6 - 19.5x10^6$	1200 - 1500	No	--	12
40 sec to 2 min	1.0 - 27	810	$7.5x10^6$ to $32.5x10^6$	1500 - 6500	Yes	--	13
10 - 50 sec	1 - 8	530	$2 - 17x10^6$	200 x 3100	Yes	--	14
20 - 150 sec	1 - 22.5	680	$4.5 - 25x10^6$	1000 - 2500	Yes	--	15
50 - 120 sec	1.7 - 24	640	$1.6 - 38x10^6$	500 - 5000	Yes	--	16
40 sec	1.2 - 25	660	$6.4x10^6$ to $31.2x10^6$	1000 - 2500	Yes	--	17
7 - 100 sec	34	560 - 660	$5x10^6 - 45x10^6$	1150 - 5000	Yes	--	18

Table VI. SMALL HYPERSONIC WIND

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	Aberdeen Wind Tunnel No. 4 Ballistic Research Laboratories Aberdeen Proving Ground, Maryland	Army Ordnance / BRL	Robert H. Krieger Supersonic Wind Tunnel Branch Exterior Ballistics Lab. BRL	Research, devel.	Mach 6--14.5 in. exit diam Mach 7.5--15.6 in. exit diam Mach 9.2--18.75 in exit diam Length--30 in.; plenum chamber surrounding open jet from axisymmetric nozzles	Mach 6, 7.5, 9.2	Continuous
2	Hypersonic Test Facility Aerodynamics Laboratory David Taylor Model Basin Washington 7, D. C.	BuWeps / DTMB	Technical Director Aerodynamics Laboratory David Taylor Model Basin	Research, devel., eval.	13.52 in. diam, circular, with intersecting cylindrical port holes for flow visualization, axisymmetric nozzles	Mach 5 - 10	Intermittent
3	Hypersonic Tunnel No. 8 Naval Ordnance Laboratory White Oak, Silver Spring, Maryland	BuWeps / NOL, White Oak	Dr. R. Kenneth Lobb NOL, White Oak	Research, devel., eval.	20 x 20 in., 2-dimensional nozzles; 25 in. diam, 3-dimensional nozzle	Mach 5 - 8 Mach 10	Intermittent
4	Tunnel E-2 Von Karman Gas Dynamics Facility Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Mr. G. Chester Furlong AEDC (AEOT)	Research, devel.	12 x 12 in.	Mach 5 - 8	Intermittent
5	18-Inch Hypersonic Tunnel (SCARF VI) Sandia Corporation Sandia Base, Albuquerque, New Mexico	AEC / Sandia	R. C. Maydew, Supervisor Experimental Aerodynamics Division 7132 Sandia Corp.	Research, devel.	18 in., 48 in. long, axisymmetric	Mach 4 - 11	Intermittent
6	20-Inch Mach 6 Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	20 x 20.5 in., fixed nozzle	Mach 6	Intermittent
7	22-Inch Mach 8.5 Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	22 in. diam, circular	Mach 8.5	Intermittent
8	22-Inch Helium Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	22 in. diam, circular	Mach 15 - 25	Intermittent
9	Mach 8 Hypersonic Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	18 in. diam, circular	Mach 8	Intermittent
10	Mach 6 Low Density Hypersonic Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	12 x 14 in.	Mach 6	Intermittent

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TUNNELS

Table VI

Running time	Stagnation press. (atmos.)	Stagnation temp. (^oR)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	4.6 - 150	1960	1 - $12x10^6$	115 - 1440	Yes	--	1
1 - 2 min	1 - 40	3000	0.15 - $4x10^6$	0 - 430	Yes	--	2
1 min to several hr	5 - 150	2000	3 - $50x10^6$	7000 (Mach 5) 250 (Mach 10)	Yes	Both test sections may be operated with open, half-open or closed jet configurations	3
5 min	2.7 - 87	1375	0.9 - $20.4x10^6$	1 - 2850	Yes	--	4
38 - 60 sec	1 - 20	3000	0.08 - $13x10^6$	25 - 1500	Yes (limited)	--	5
3 - 30 min	20 - 37	1060	4 - $10.5x10^6$	690 - 1260	Yes (limited)	--	6
3 - 30 min	120 - 200	1510	6.3 - $9.5x10^6$	900 - 1350	Yes (limited)	--	7
20 - 40 sec	34 - 272	540 now; 1060 in 7/62	3 - $20x10^6$ now; 2.5 - $9x10^6$ in 7/62	--	Yes (limited)	For each 30-second run, a 3-hour pump-up time.	8
3 - 30 min	20 - 170	1500	1 - $10x10^6$	200 - 1600	Yes (limited)	Under construction.	9
3 - 30 min	1 - 40	1060	0.7 - $10x10^6$	120 - 1600	Yes (limited)	--	10

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Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
11	Hypersonic Aerothermal-Dynamics Facility Superpressure Leg (Nitrogen) Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	2 ft diam	To Mach 17	Intermittent
12	12-Inch Hypersonic Ceramic Heated Tunnel Applied Materials and Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	12 in. diam; enclosed free jet with downstream diffuser	Mach 13	Intermittent
13	Hypersonic Aeroelasticity Tunnel (Helium) Dynamic Loads Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	Mach 7: 8 in. diam Mach 15: 24 in. diam	Mach 7, 15	Intermittent
14	15-Inch Hypersonic Flow Apparatus Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	15 in. diam, axisymmetrical	Mach 10.4	Intermittent
15	2 x 2 Ft Low Density Hypersonic Tunnel Full-Scale Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel., eval.	24 x 24 x 54 in.	Mach 3 - 7	Continuous
16	10 Megawatt Arc Tunnel Structures Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	24 in. diam open jet within enclosure, 32 in. long	Mach 8	Intermittent
17	14-Inch Helium Nozzle NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	14 in. diam, 36 in. long	Mach 10, 15, 20, 25	Intermittent (blowdown)
18	Hypersonic Helium Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	20 in. diam	Mach 8, 15, 20, 26	Intermittent (blowdown)
19	Prototype Hypersonic Free Flight Facility NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	2 ft diam, 40 ft long	To 10,000 fps; model velocity to 23,000 fps	Measured in no. of rd
20	Supersonic Free-Flight Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	17 x 21 in., 24 ft long	To 2,010 fps; model velocity to 20,000 fps	Measured in no. of rd (260 per yr)
21	24-Inch-Diameter Mach-7 Wind Tunnel NASA Lewis Research Center Cleveland 35, Ohio	NASA / NASA	NASA Director NASA Lewis Research Center	Research	24.25 in. diam, 3 ft long	Mach 7	Continuous

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Table VI (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
30 sec	100 - 1000	4000	90×10^3 to 90×10^4	13 - 130	Yes (limited)	Characteristics shown for this facility are design objectives; facility is under construction.	11
30 sec	40	4100	$30 - 40 \times 10^3$	110	Yes (limited)	--	12
20 sec	1 - 80 (Mach 7) 12 - 80 (Mach 15)	Ambient	$0.5 - 29 \times 10^6$ (Mach 7) $1.3 - 8.8 \times 10^6$ (Mach 15)	100 - 5600 (Mach 7) 100 - 670 (Mach 15)	Yes	Helium tunnel.	13
10 min	20 - 100	1960	$0.5 - 2.5 \times 10^6$	70 - 360	Yes (limited)	--	14
--	0.25 - 3.7	1200	$0.14 - 1.5 \times 10^6$	15 - 340	Yes (limited)	--	15
60 sec	41 - 640	To 16,000	0.76 to 15.35×10^3	8.6 - 141	Yes (limited)	--	16
Mach / min 10 / 10 15 / 10 20 / 10 25 / 20	3 - 135	530	$0.32 - 30 \times 10^6$	12 - 3460	No	--	17
Mach / sec 8 / 40 15 / 90 20 / 105 26 / 120	24 - 285	610	$7 - 13 \times 10^6$	260 - 1960	Yes (limited)	--	18
--	30 - 3000	25,000 Btu per lb	To 60×10^6	10,000 to 2,500,000	Yes (limited)	Will be completed about December 1961. Gun-launched models fired counter to airstream.	19
--	0.07 - 10.5	--	$0 - 5 \times 10^8$	4,000,000 to 5,000,000	Yes (limited)	Gun-launched models fired counter to airstream.	20
--	14 - 32	1260	$1.6 - 9.8 \times 10^6$	256 - 555	No	On stand-by basis.	21

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
22	21-Inch Hypersonic Wind Tunnel Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, California	NASA / JPL	Director Jet Propulsion Laboratory	Research, devel.	21 x 21 in. to 27 in. high, flexible nozzle	Mach 4 - 11.5	Continuous
23	Low Density Hypersonic Gasdynamic Facility Aeronautical Systems Division Wright-Patterson Air Force Base, Ohio	Air Force / ASD	Paul J. Corcoran ASD-WWFP Wright-Patterson AFB	Research, devel.	2 x 2 ft, 2-dimensional	2500 - 3500 fps	Intermittent
24	12-Inch Hypersonic Wind Tunnel Edmund P. Allen Memorial Aerodynamics Laboratory Boeing Airplane Company Seattle, Washington	Boeing / Boeing	John H. Russell, Chief Wind Tunnel Engineer Dept. 2-5000, Box 50-82 Boeing Airplane Company	Research, devel.	12 in. diam open jet	Mach 5 - 7.6	Intermittent
25	Fluidyne Hypersonic Wind Tunnel Fluidyne Engineering Corporation 5740 Wayzata Boulevard Minneapolis, Minnesota	Fluidyne / Fluidyne	Mr. J. Leonard Frame Fluidyne Engineering Corp.	Devel.	24 in. diam	Mach 6 - 18	Continuous
26	Tunnel No. 2 Rosemount Aeronautical Laboratories University of Minnesota Rosemount, Minnesota	Air Force / Rosemount	Karl Stefan Rosemount Aeronautical Laboratories	Research	12 x 12 in.	Mach 1.5 - 10	Intermittent
27	Tunnel No. 4 Rosemount Aeronautical Laboratories University of Minnesota Rosemount, Minnesota	Air Force / Rosemount	Dr. Rudolf Hermann Rosemount Aeronautical Laboratories	Research, devel.	12 x 12 in.	Mach 5.5 - 10	Intermittent
28	Plasma Jet Hypersonic Hyperthermal Wind Tunnel Aero Space Sciences Laboratory School of Aeronautical Engineering Sciences Purdue University Lafayette, Indiana	Purdue / Purdue	Prof. G. M. Palmer School of Aeronautical Engineering Sciences Purdue University	Instruction, research, devel.	1 ft diam or less	0 - Mach 10, but hyperthermal in nature	Continuous
29	Hypersonic Wind Tunnel Aerodynamic Laboratory The Ohio State University Columbus 10, Ohio	Ohio State / Ohio State	Dr. J. D. Lee Aerodynamic Laboratory Don Scott Field Columbus 10, Ohio	Research, devel.	12 in. diam circular, free jet	Mach 6 - 14	Intermittent
30	Hypersonic Wind Tunnel Polytechnic Institute of Brooklyn Aerodynamics Laboratory 527 Atlantic Avenue Freeport, New York	Air Force / Brooklyn Polytechnic	Dr. Antonio Ferri Aerodynamics Laboratory Polytechnic Institute of Brooklyn	Research	12 in. diam 24 in. diam 44 in. diam	Mach 6 Mach 8 Mach 12	Intermittent

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Table VI (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (^{o}R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	1 - 50	1810	40,000 to 8.8×10^6	29 - 1224	Yes	High-pressure air supply for cold jet testing.	22
18 - 80 sec	0.05 - 1	750	0.9×10^3 to 1×10^6	3.5 - 70	Yes	Being modified to give higher temperature air and higher Mach numbers, and finally to a low-density arc plasma generator.	23
1 min (Mach 5); 2.5 min (Mach 7)	122	1460	3.4 - 35×10^6	1193 - 2988	No	--	24
--	14 - 140	4500	1.5×10^3 to 6×10^8	2 - 4600	Yes	Zirconia pebble-bed heater.	25
30 sec	To 40.8	To 1440	1.5 - 20×10^6 (Mach 2) 0.28 - 3.6×10^6 (Mach 7) 0.1 - 0.6×10^6 (Mach 10)	925 - 18,500 (Mach 1.5) 60 - 400 (Mach 7)	Yes	--	26
30 - 120 sec	3.3 - 11	3000	0.1 - 1.6×10^6 (Mach 7) 0.4 - 3×10^5 (Mach 10)	60 - 200 (Mach 7)	Yes	--	27
--	Vacuum to 30	10,000 to 12,000	--	10 - 1000	Yes	--	28
30 - 120 min	3 - 100	2800	0.3 - 3×10^6	30 - 200	Yes (limited)	--	29
15 - 60 sec	2 - 40	2600	0.5×10^5 to 4×10^6	3 - 1380	No	--	30

Table VII. LARGE HYPERSONIC WIND

Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
1	Tunnel B Von Karman Gas Dynamics Facility Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Mr. G. Chester Furlong AEDC (AEOT)	Devel., eval.	50-in. diam, circular, axisymmetric contoured nozzle	Mach 8	Continuous
2	Tunnel C Von Karman Gas Dynamics Facility Arnold Engineering Development Center Arnold Air Force Station, Tennessee	Air Force / ARO, Inc.	Same as above	Devel., eval.	50-in. diam, circular, axisymmetric contoured nozzle	Mach 10 Mach 12	Continuous Continuous
3	Continuous Flow Hypersonic Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	31 x 31 in.	Mach 10 Mach 12	Continuous Continuous
4	Mach 13 Ceramic Heated Tunnel Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	27 in. diam	Mach 13	Intermittent
5	Hyperthermal Leg, Hypersonic Aerothermal-Dynamics Facility Aero-Physics Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	4 ft diam, cylindrical	8,000 - 20,000 fps approx.	Intermittent
6	Hypersonic Dynamics Leg (Helium), Hypersonic Aerothermal-Dynamics Facility Dynamic Loads Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research, devel.	3 ft diam 5 ft diam	Mach 10 Mach 20	Intermittent Intermittent
7	8-Ft High Temperature Structures Tunnel Structures Research Division NASA Langley Research Center Langley Field, Virginia	NASA / NASA	NASA Director NASA Langley Research Center	Research	8 ft diam x 14 ft long	6300 - 7300 fps approx.	Intermittent
8	3.5 Ft Hypersonic Wind Tunnel NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	3.5 ft diam, 90 in. long	Mach 5, 7, 10, 15	Intermittent
9	Mass Transfer and Aerodynamics Facility NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	Two test sections: Mass transfer 30 in. diam Aerodynamic 30 in. diam	Mach 5 Mach 20 (approx.)	Intermittent Intermittent
10	Atmosphere Entry Simulator NASA Ames Research Center Moffett Field, California	NASA / NASA	NASA Director NASA Ames Research Center	Research	5 x 5 in. to 60 x 60 in., 40 ft long	Flow gradient 0 to 2400 fps in nozzle, model velocities to 23,000 fps	Measured in no. of rd

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TUNNELS

Table VII

Running time	Stagnation press. (atmos.)	Stagnation temp. (°R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
--	6.7 - 53.3	1360	0.4×10^6 to 3.3×10^6	67 - 520	Yes	--	1
--	11.7 - 160	1960	0.3×10^6 to 3×10^6	43 - 520	Yes	--	2
--	11.7 - 160	2460	0.3×10^6 to 1.25×10^6	58 - 245	No	Under construction.	
--	15 - 150	1950	0.22×10^6 to 2.2×10^6	45 - 575	Yes	Under construction.	3
--	30 - 300	2700	0.32×10^6 to 3.2×10^6				
760 sec	70 - 80	4500	0.2×10^6	80	Yes	Under construction.	4
2 - 3 min	4 - 100	Enthalpy 9,000 Btu per lb	0.1×10^6	0.25 - 20	Yes	Under construction.	5
10 sec	2 - 270	1060	0.43×10^6 to 58×10^6	50 - 7000	Yes	Under construction.	6
10 sec	15 - 270	1060	1.1×10^6 to 19×10^6	50 - 900			
To 4 min	30 - 267	4500	0.15×10^6 to 2×10^6	150 - 1700	Yes	Under construction.	7
1 - 4 min	3 - 135	4260	0.04×10^6 to 6.9×10^6	332 - 2550	Yes	--	8
10 min	6.7	Enthalpy: 10,000 Btu per lb;	$1 - 1 \times 10^5$	7 - 790	Yes	Characteristics shown for this facility are design objectives. The facility is under construction	9
10 min	100	2,000 Btu per lb	4.2×10^5				
About 240 rd per yr	4 - 13	15,000	$0 - 62 \times 10^6$	400 - 225,000	Yes	This unique facility fires models into an air-stream with a density gradient to simulate re-entry.	10

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Item	Name and location	Owner / Operator	Contact	Use	Test section: Dimensions and features	Speed range	Intermittent or continuous
11	Pebble-Bed Hypersonic Wind Tunnel Facility Republic Aviation Corporation Farmingdale, Long Island, New York	Republic / Republic	Mr. T. Himka Republic Aviation Corp.	Research, devel.	36 in. diam, closed-jet type	Mach 6 Mach 14	Intermittent Intermittent
12	Wave Supersonic Hypersonic Tunnel Cornell Aeronautical Laboratory, Inc. 4455 Genesee Street Buffalo 21, New York	Cornell/Air Force / Cornell	Mr. John P. Andes, Head Hypersonic Tunnel Dept. Cornell Aeronautical Lab., Inc.	Research, devel., eval.	Variable up to 7 ft diam at Mach 15, circular	Mach 6 - 15	Intermittent (blowdown)
13	Hypersonic 2-Ft Tunnel Aerophysics Laboratory Douglas Aircraft Company 2332 E. El Segundo Boulevard El Segundo, California	Douglas / Douglas	R. W. Bratt, Chief Aerophysics Laboratory Douglas Aircraft Co. 827 Lapham St. El Segundo, Calif.	Research, devel.	24 in. diam x 32 in. 25 in. diam x 32 in. 27 in. diam x 32 in.	Mach 6 Mach 8 Mach 10	Intermittent
14	Hypersonic Wind Tunnels Polytechnic Institute of Brooklyn Aerodynamics Laboratory 527 Atlantic Avenue Freeport, New York	Air Force / Brooklyn Polytechnic	Dr. Antonio Ferri Polytechnic Institute of Brooklyn Aerodynamics Laboratory	Research	12 in. diam 24 in. diam 44 in. diam	Mach 6 Mach 8 Mach 12	Intermittent

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Table VII (continued)

Running time	Stagnation press. (atmos.)	Stagnation temp. (^{o}R)	Reynolds no./ft	Dynamic pressure (lb/sq ft)	Available to others	Limitations and comments	Item
30 sec	3.4 - 190	3500	0.1×10^6 to 7.5×10^6	100 - 1200	--	--	11
30 sec	3.4 - 190	3500	0.07×10^6 to 0.35×10^6	100 - 1200			
15 sec	20 - 200	9000	1×10^4 to 2.5×10^6	10 - 3600	Yes	--	12
3.6 min	5 - 150	2460	0.7×10^6 to 9.8×10^6	200 - 700	Yes	--	13
15 - 60 sec	2 - 40	2600	0.05×10^6 to 4×10^6	3 - 1380	--	--	14

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ABBREVIATIONS

Organizations

AEC	Atomic Energy Commission
AEDC	Arnold Engineering Development Center
ARPA	Advanced Research Projects Agency
ASD	Aeronautical Systems Division (formerly WADD)
BRL	Ballistic Research Laboratories
BuWeps	Bureau of Naval Weapons
D/Commerce	Department of Commerce
DTMB	David Taylor Model Basin
JPL	Jet Propulsion Laboratory
M.I.T.	Massachusetts Institute of Technology
N.A.A.	North American Aviation, Inc.
NASA	National Aeronautics and Space Administration
NOL	Naval Ordnance Laboratory
ODDR&E	Office of the Director of Defense Research and Engineering
USAF	U. S. Air Force
USNMC	U. S. Naval Missile Center
WADD	Wright Air Development Division

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Technical and general

admin.	administration
approx.	approximately
atmos.	atmosphere(s)
BLC	boundary layer control
Btu	British thermal unit
cps	cycles per second
devel.	development
diam	diameter
eval.	evaluation
F	Fahrenheit
fps	feet per second
ft	feet/foot
hp	horsepower
hr	hour(s)
in.	inch(es)
lb	pound(s)
max.	maximum
min	minute(s)
min.	minimum
mph	miles per hour
press.	pressure
psi	pounds per square inch
psia	pounds per square inch absolute
R	~~Réaumur~~ RANKINE
rd	round(s)
sq	square
temp	temperature
vac	vacuum
V/STOL	vertical/short take-off and landing
yr	year(s)